

SECTOR 7

SKAGERRAK—SOUTH SIDE, CENTRAL ISLANDS, MAIN PASSAGES OF KATTEGAT, AND SJAELLAND—NORTH COAST

Plan.—This sector describes the approach to the Kattegat via the Skagerrak, and the main passages through the central portion of the Kattegat. The arrangement of this sector is NE from Hanstholm to Skagen, the NE extremity of Sjaelland (Jylland), then S through the Kattegat, describing the islands of Laeso, Anholt, and Hesselø, the shoals and banks in the central part of the Kattegat and the two main channels passing W and E of them; followed by a description of the N coast of Sjaelland, from The Sound at the SE end of the Kattegat to its SW end with Lille Bælt and Store Bælt, including the fjords indenting the middle of the coast.

General Remarks

7.1 The S side of the Skagerrak from Hanstholm to Skagen, a distance of about 77 miles ENE, is generally low and backed by sand dunes, but there are several areas where steep cliffs face the coastline. Vigo Bugt, Jammerbugt, and Tannis Bugt indent this coast.

The boundary line between the North Sea and Skagerrak extends from the Danish coast at **Hanstholm** (57°07'N., 8°36'E.) on Sjaelland to the Norwegian coast at **Lindesnes** (57°59'N., 7°03'E.).

Numerous wrecks, some buoyed, lie up to 20 miles offshore along the S side of the Skagerrak.

Ice.—Ice information reports and icebreaker service for the Baltic coast of Denmark are made available on request from the State Ice Service or from any icebreaker.

The coast radio station (CRS), in its daily ice reports, may instruct vessels approaching ice bound areas to contact the State Ice Service.

Requests for icebreaker assistance should be made to an icebreaker, if the icebreaker is in the vicinity, or to the State Ice Service. The following information should be provided:

1. Name.
2. Nationality.
3. Call sign.
4. Size.
5. Engine power.
6. Year built.
7. Amount of cargo.
8. Destination.
9. ETA at ice-covered waters.

A vessel should notify the State Ice Service immediately by telephone of any delay or cancellation of voyage subsequent to request or report made previously.

Danish icebreakers and their call signs are as follows:

Vessel	Call sign
Danbjom	OYDA
Isbjom	OXIS
Elbjom	OYTD
Thorbjom	OXCT

Icebreakers can be contacted on 500 kHz; 2,182 kHz; and on VHF channel 16, throughout 24 hours.

On arrival at the ice, vessels must report to the icebreaker either directly or through a coast radio station (CRS). Vessels receiving assistance must maintain continuous watch on the channel specified by the icebreaker.

Tides—Currents.—The currents between Hanstholm and Skagen, set in the direction of the coast, E or W according to the direction of the wind. More prevalent is the E going current. In Jammerbugt and from Hirtshals to Skagen, the current generally sets E, with an average rate from 0.5 to 1.5 knots. A storm could increase this rate to 3 or 4 knots. The tidal range on this coast is about 0.3m in calm weather, with no tidal current.

Winds between SW and NW may raise the water level to about 2.5m. From a NE and E direction, winds may lower the level 1.1m.

Pilotage.—Vessels inbound for ports in NW Europe usually engage deep sea pilots before reaching the intricate traffic separation schemes in Dover Strait and the North Sea areas.

The pilots are licensed, and should be requested through a pilotage agency based in the British Isles or other European country. Deep sea pilots travel long distances mostly to the port of embarkation, therefore much advance notice should be given to the pilotage agency.

Vessels should provide ETA at required boarding place 48 and 24 hours prior to arrival. Pilot boards off Brixham and Cherbourg (by launch or helicopter), Penzance, Fishguard, Dover, or Pentland Firth (by launch only) or in any port in NW Europe.

Vessels should provide ETA at required boarding position 48 hours prior to arrival and then confirmed 2 hours before ETA on VHF channel 9.

Request for pilot should be made 48 hours prior to vessel's arrival and message is transmitted through Scheveningen Radio, stating ETA at pilot boarding position. Pilots board off Brixham, Cherbourg, or Brunsbuttele.

Great Belt Ferry Routes S of Sprogø.—Procedures apply to vessels with a draft of 13m and over and to vessels of 20,000 grt and greater. Vessels with a draft of 10m and over may also participate.

These vessels should advise the ferries (call sign "Ferryleader" on VHF channels 16 and 10) of the time of their intended passage 1 hour before transiting the area of the Great Belt ferry routes, S of Sprogø. Vessels not equipped with VHF radio should advise SHIPPOS Aarhus 2 hours in advance of the above.

Development.—Work is in hand to construct a fixed rail and motorway link across Oresund (The Sound) that will extend just under 16 km from the NE side of Kastrup Airport (Copenhagen) in position (55°38'N., 12°40'E.), passing S of



PORT OF HANSTHOLM

Saltholm and then transverse Flintrannan to the Swedish coast in the vicinity of Lemacken.

The key elements of the link will be:

1. An artificial peninsula extending 430m out from the Danish coast at Kastrup.
2. A 3,750m immersed tunnel between the artificial peninsula and an artificial double island, crossing the Drogden channel.
3. An artificial double island of 4,210m from end to end with a 600m bridge in the middle, connecting the 2 islands, S of Saltholm.
4. A 1,090m long elevated bridge, with a free span of approximately 490m and a vertical clearance of 55m, crossing Flintrannan. There will be an E and W approach bridge to the elevated bridge. The E approach bridge from the Swedish coast to the elevated bridge will be 3,740m and the W approach bridge 2,640m.

Construction work commenced in September 1995 and is scheduled for completion in 2000.

Hanstholm to Hirtshals

7.2 Hanstholm (57°07'N., 8°36'E.) the NW extremity of Sjaelland, is a promontory, consisting of chalk and limestone, rising abruptly from the sea. A light marks the NW part of the promontory. The summit of Hanstholm rises to 67m. The summit is named Hjertebjerg. It has a beacon.

A 10m patch and a 11m patch, lie about 3 miles WNW and 4 miles NE, respectively of Hanstholm Light.

Hanstholm Havn (57°08'N., 8°36'E.) (World Port Index No. 30455) is a fishery and commercial harbor, entered about 1 mile NNW of Hanstholm Light.

The size of the largest vessel which can be accommodated depends upon wind, current, and sea conditions at the time of entry. Under favorable conditions, the harbor is accessible, day or night, to vessels up to 130m in length, 20m beam, and 6.5m draft.

There are depths of 7m, on the lighted entrance range through the outer harbor. The inner harbor on its W side also maintains a dredged depth of 7m alongside the piers on its E and W sides.

Tides—Currents.—The mean tidal range is 0.3m. The water level is raised in W winds by up to 1.3m and lowered in E winds by up to about 1.5m. The harbor is reported as ice-free all year.

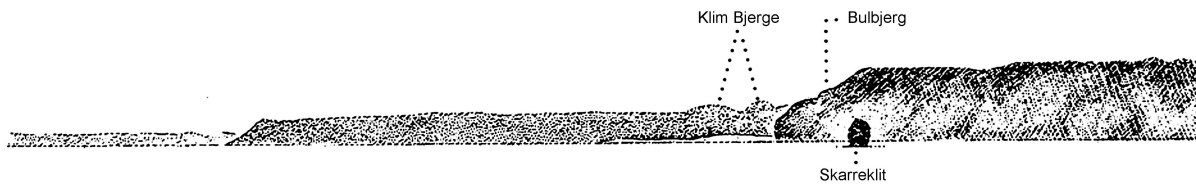
Depths—Limitations.—There are eight basins located at Hanstholm Havn. Basins 1, 2, and 3 are commercial and fishery basins. Basins 4, 5, 6, 7, and 8 are exclusively fishery basins.

Basin	Depth	Remarks
Basin 1	7m	Quays 11 and 12 on S side of W inner mole; Quay 13 on E side of Pier 1; Quay 17 on W side of Pier 3.
Basin 2	7m	S of Basin 1; Quay 21 on S side of Pier 2; Quay 24 on E side of basin.
Basin 3	7-7.5m	Quay 85 along S side of E inner mole. There is a ramp on the SE corner of the basin.
Basin 4	4.9m	Quay 41 on E side of Pier 3; Ice pier at S corner of basin; Quay 43 on W side of Pier 4.
Basin 5	4.9m	Quay 51 on E side of Pier 4; Quay 53 on W side of Pier 5.
Basin 6	4.9m	Quay 61 on W side of basin
	3.9m	Quay 64 on Pier 6 on E side of basin.
Basin 7	—	A very small basin, enclosed by Pier 7 near root of Pier 5.
Basin 8	5.9m	Quays 18 and 81 along the N side of Pier 3; Quay 82 along the N side of Pier 4; Quay 83 along the N side of Pier 5.

Pilotage.—Pilotage for Hanstholm Havn is compulsory for non local merchant vessels of more than 450 grt or with a length of more than 49m. Harbor pilots are available at Hanstholm and should be requested through Skagen Radio, or by VHF to the harbor watch, 6 hours before ETA.

Regulations.—Regulations for navigation in Danish inner waters are in force, except out-going vessels have precedence.

The maximum speed inside the inner moles is 3 knots. Foreign pleasure craft may only visit the harbor with prior approval of the Harbormaster.



BULBJERG FROM WNW

7.3 Vigso Bugt extends 11 miles E from Roshage to **Sandnaeshage** (57°09'N., 8°58'E.). Prominent on this part of the coast is the **Vigso Beacon** (57°06'N., 8°45'E.), **Hjardemal Church** (57°03'N., 8°48'E.), and **Lild Church** (57°06'N., 9°00'E.). Vigso Bugt has two coastal ridges and sometimes a third ridge forms in the W part of the bight but off Sandnaeshage a sand ridge does not appear, the bottom being composed of medium sized stones.

Bulbjerg (57°10'N., 9°02'E.) is a whitish yellow cliff of limestone with a steep seaward face, 47m high, and is the termination of a hilly ridge extending about 3 miles inland.

Bulbjerg makes a good mark, being visible at a distance of about 20 miles.

Skarreklit (57°09.6'N., 9°01.5'E.), a vertical limestone rock, 15m high, lies about 59m offshore, N of Bulbjerg.

Bragerne (57°10'N., 8°56'E.), a detached rocky shoal lies about 3 miles W of Skarreklit, and about 2 miles offshore, NW of Lild Strand. This shoal consists of 2 rocks with a least depth of 2m; a wreck with a depth of 0.3m lies on the shoal.

Between the shoal and shore there is a narrow channel with a 7.9 to 9m depth and identical depths are found close N.

About 2 miles NW of Bragerne in 57°13.3'N, 8°39.1'E, a foul area was reported.

Jammerbugt extends about 40 miles NE from Bulbjerg to Hirtshals. The coast of the bay between Bulbjerg and Svinklov, 10 miles E consists of low dunes; farther inland, near Klim Bjerg, the dunes are higher. Svinklov, 9 miles E of Bulbjerg is a prominent chalk and limestone ridge covered with vegetation. A conspicuous white chalk cliff appears on the NW corner of Svinklov.

Other landmarks along this coast of the bay are **Lokken** (57°23'N., 9°43'E.) where there is a conspicuous beacon, and also the church at Borglum Kloster, 3 miles ESE of Lokken.

A light is shown from a tube mast at the head of a breakwater, which extends 183m NW from the shore at Lokken.



HIRTSHALS LIGHT

Rubjerg Knude, a prominent hill, about 5 miles NNE of Lokken, consists of sand and clay, and drops to the sea in a steep cliff. The hills on both sides of Lonstrup, about 2 miles farther NNE, also consist of sand and clay with steep cliffs.

Bakken and Lonstrup Rodgrund, two detached shoals with depths of 6.6m, lie about 5 miles and 3 miles, respectively, W of Lonstrup.

A line-throwing apparatus is maintained at **Lonstrup** (57°28.2'N., 9°48'E.).

Hirtshals, a point about 10 miles NNE of Rubjerg Knude, has a hilly coast in its vicinity.

Hirtshals Light (57°35'N., 9°57'E.) is located slightly S of the NW extremity of the point and close to the coast. Depths of 7.5 and 9.5m lie up to 2 miles W and NW of Hirtshals. A fog signal and radio beacon operates from Hirtshals Light.

7.4 Hirtshals Havn (57°36'N., 9°58'E.) (World Port Index No. 30450) is principally a fishing port, located on the NE side of Hirtshals. The port is open all year round, and is protected by 2 converging breakwaters. An outer breakwater extends about 0.2 mile NNW of the W breakwater.

A breakwater, extending ENE from the W breakwater, separates the outer harbor from the inner harbor. The inner harbor consists of an E basin, 3 center basins, and a W basin.

Tides—Currents.—The mean tidal range is reported to be about 0.3m. Storms from W may raise the water level 1.5m, and storms from E may lower the water level about 1m. The current usually sets E across the entrance.

Depths—Limitations.—The shallowest depth in the approach is 8m. Dredged depths in the basins range from 6.2 to 7.5m. The largest vessel that can normally enter the harbor is 125m long, 25m beam, and 7.5m draft.

Aspect.—Range lights lead into the outer harbor.

Pilotage.—Pilotage is not compulsory but in the absence of local knowledge, the assistance of a harbor pilot is available, and may be requested through Skagen Radio, or directly to the harbor watch by VHF radio.

Regulations.—The regulations for the navigation of Danish inner waters are in force in the harbor area.

Signals.—Signals from a mast in the SW harbor indicate vessels are prohibited from entering or leaving the harbor.

By day, vessels display two cones, points together, over a ball. By night, vessels display, a green light above a white light above a red light.

Caution.—Critical at Hirtshalls Havn are the storms that may cause a change in depths outside the harbor entrance.

Vessels intending to enter the harbor should first obtain information concerning the depths from the harbor office.

Hirtshals to Skagen

7.5 The coast between Hirtshals and Skagen, the NE extremity of Jylland, forms Tannis Bugt. This indented coastline, about 22 miles long, is backed by low sand dunes that increase in height as they extend across the peninsula to the shore of the Kattegat.

Aspect.—Several landmarks, in addition to Hirtshals Light, and the town of Hirtshals, are conspicuous.

Bjergby Church (57°31'N., 10°03'E.), without a steeple; Gammel Skagen Beacon, W of Skagen at about 5 miles; old Skagen Church, partially covered with sand; Skagen Lighthouse; and the old unused light structure SE.

The town of Skagen with its old and new churches and the Hojen Old Lighthouse, 3 miles W of Grenen are helpful.



GAMMEL SKAGEN BEACON BEARING ABOUT 096°



OLD SKAGEN LIGHT STRUCTURE BEARING ABOUT 174°



SKAGEN LIGHT BEARING ABOUT 174°



HOJEN OLD LIGHTHOUSE BEARING SE

Skagen Light (57°44'N., 10°37'E.) is shown from a gray, round tower, 46m high, standing near the S coast. A racon is situated at the light.

Skagens W Light, is shown from a white round tower, about 2 miles NW of Skagen Light. The light is illuminated in the daytime and in poor visibility. The fog signal is heard most strongly in a NW direction.

Skagens Rev extends ENE from **Grenen** (57°44'N., 10°39'E.) for about 2 miles, and consists of hard, white sand.

A number of wrecks lie on Skagens Rev. The N side of the spit is steep-to and should not be approached in depths less than 25m because of the rapid shoaling of less than 8m that takes effect. The depths on the S side of the spit increase gradually seaward. By day, the edge of the spit can be seen from aloft by the discoloration of the water, and during gales the sea breaks along the whole spit.

East gales cause the ice to pile up on the shallowest part of Skagens Rev in winter, and will sometimes remain there for a long time after the rest of the ice has disappeared.

Route T lighted buoy No. 1 is moored about 6 miles NE of Skagen Light.

Pilotage.—A pilot vessel is stationed at Skagen, and pilotage is available for the North Sea and Kattegat, also The Sound, Store Baelt, Lille Baelt, and sometimes the Baltic Sea.

Pilots can be ordered at all hours via Skagen Radio; it is advisable to request a pilot at least 12 hours in advance with a confirmation 3 hours before arrival. Pilots board in positions about 3 miles N (Skagen 1) and 4 miles E (Skagen 2) of Skagens Light.

Caution.—Vessels are warned against passing close to the buoys marking the extremity of Skagens Rev due to the strong current which frequently sweeps round the spit.

Central Islands and Main Passages—Kattegat

7.6 The Kattegat is the sea area lying between the W coast of Sweden from Pater Noster Skaren to Kullen, and the N part of the E coast of Sjaelland (Jylland) from Skagen to Bjornsknude.

Its S portion is bordered by the N coasts of Sjaelland and Fyn. The Kattegat can be entered from S by the passages E of Sjaelland, between Sjaelland and Fyn, and W of Fyn, respectively.

The central part of the Kattegat is occupied by the Danish islands of Laeso, Anholt, and Hesselø, which are surrounded by banks, shoals and reefs extending considerable distances from the islands in some places.

The central islands, banks, and shoals divide the Kattegat into 2 main channels connecting the N and S entrances. The E channel, the one most commonly used, is deeper than the W, and is less encumbered with shoals. Both the E and W channels are well marked by navigational aids. The E channel, with ample depths to accommodate the largest vessels, is used by vessels bound for the Sound and the E part of the Baltic Sea.

The W channel, depending on the ship's draft, is used by vessels bound for Store Baelt, Lille Baelt, and the W part of the Baltic Sea.

A fixed bridge and overhead cables with a vertical clearance of 33m, span Lille Baelt. In winter, when the lightships and lighted buoys may be off their stations, it is not advisable for vessels with drafts of more than 5.5m to use the W channel because of the shoals S of Laeso Rende.

The bottom of the Kattegat consists mostly of fine or coarse yellowish sand. Gravel, usually of a reddish-brown color, is found in places, especially in the E part. Stones of various sizes are found throughout the Kattegat, except in the deeper parts where the bottom is mainly clay covered with mud.

Ice.—Ice usually forms first on the coastal shoal of Sjaelland in the Sound, the N coasts of Sjaelland and Fyn, and the entrances to the fjords of Jylland; navigation in the above-mentioned waters will, at such time, often be impossible without the aid of icebreakers.

At this time, ice in the Kattegat only forms on the flat shoals S and E of Laeso, and along the coast of Jylland and nearby islands, appearing mainly as broken pieces of ice frozen together.

One to two weeks after the permanent freezing has appeared, and large quantities of ice appear in The Sound; low-powered vessels can no longer pass through The Sound.

If freezing persists, ice will soon appear in Osterrenden (the E Channel) and Vesterrenden (the W Channel); this ice is not only drift ice from The Sound, Store Baelt, and Lille Baelt, but also ice formed in the Kattegat.

In addition, ice formed near the bottom, or in layers between the bottom and the surface, may suddenly appear in great masses, and over long stretches; this ice has the shape of small, round plates.

In the Kattegat, after a considerable time of freezing temperatures, this layer of thin ice has been formed in one single, calm night. Absolute calm weather is necessary for the formation of this ice. This thin layer may, however, increase rapidly to pack ice.

In recent years, it has been observed that thin ice forms earlier in the Kattegat than in The Sound, Store Baelt, and Lille Baelt. This is particularly true with NE and E winds; which cause colder weather on the Swedish coast than farther offshore. When strong E or NE winds have abated, ice forms immediately off the Swedish coast and extends a considerable distance offshore. This occurs more so when there is a N current, setting for some time so that the fresher Baltic water replaces the upper layer of more saline water that has penetrated from the Skagerrak.

The shoal water in Skalderviken and Laholms Bukten together with the fresh waters from the rivers discharging into the bays accelerates the formation of ice in these bays. On several occasions in recent years, thin ice has formed from Kullen to Morups Tange and Anholt while the fairways in The Sound were clear of ice.

When the formation of ice, in combination with the drift ice from the Baltic Sea, fills the greater part of the Kattegat, navigation is impossible without the assistance of an icebreaker. It is risky for large steam vessels to force their way through the ice in the Kattegat under these conditions.

Thin ice, or an open channel, through which a vessel may pass, may be found, especially in Osterrenden, or off the Swedish coast; however, passage during the long nights of January and February is dangerous, and the passage S of Kullen may be impassable without the aid of an icebreaker.

When there is considerable ice in the Kattegat, a vessel should avoid the area between Anholt and Morups Tange, and the vicinity of Paternosters; the ice has the tendency to pack in these areas due to the fact that the N-going currents set towards the Swedish coast.

Severe icy winters may last 2 to 3 months, but there are no set rules for their duration. Some have lasted no longer than a week or two. A long period of ice may be interrupted by periods of thawing due to strong W winds. Rarely does the Kattegat become completely filled with ice, and Osterrenden is usually the last to become impassable.

The end of an ice period usually begins with W winds, causing high water, which lifts the ice clear of the coastal shoals, driving it to sea. Vesterrenden may thus be free of ice in a 3 to 4 day period. At other times, strong SW and W winds have blown for two 24-hour periods without clearing Laeso Rende, even though the N part has been free of ice.

If W winds, which first started to move the ice, are followed by S winds with fog and rain, the ice disintegrates rapidly and drifts out into the Skagerrak. If W winds remain, or E and W winds interchange, it may take several weeks before the Kattegat is free of ice. This ice may, after a long period of freezing, reach a thickness of about 2m or more. This pack ice may, according to the wind direction, pile up on one side or the other of the Kattegat.

Store Baelt becomes navigable at about the same time as the Kattegat, while The Sound has difficulty in freeing itself of the heavy ice, sometimes being about a week or more later.

While the ice is clearing the Kattegat, the Swedish side is often less navigable, especially in the vicinity of Laholms Bukten. The current from the Baltic along the coast of Sweden, eventually forces the ice N.

Regulations.—Passage through Danish waters between the North Sea and the Baltic follows the mineswept lanes through the Kattegat.

These sea lanes are well marked by navigational aids but there are areas where large vessels can find restricted waterways troublesome, and also having to deal as well with sharp turns, and shallow depths.

The Danish Government has established a radio reporting service known as SHIPPOS to ensure the safety of large vessels passing through these waters. Further information on SHIPPOS can be found in Pub. 140, Sailing Directions (Planning Guide) North Atlantic Ocean, Baltic Sea, North Sea, and the Mediterranean Sea.

Pilots to The Sound can be obtained at the Goteborg Pilot Station (See Sector 6).

Laeso (57°17'N., 11°00'E.)—Adjacent Shoals and Banks

7.7 Laeso is the N most of the islands in the Kattegat which lies approximately 11 miles off the coast of Jylland.

Since Laeso is low and is surrounded in all directions by long projecting reefs and shoals, the island presents a prominent obstruction for navigation of the Kattegat. The N coast is the highest part, since there is a ridge of sand dunes.

Hojlande (57°18'N., 11°02'E.), the highest hill, with a height of 24m, lies in the middle of this coast. Danzigmand, 12m high, lies close W of Syrodde, the E extremity of Laeso; Jegenshoj, 9m high, a little farther W, can be recognized by a deep cleft in the middle. A light is shown on Syrodde.

Northwest side of Laeso.—Laeso NW Rev, a sand bank with depths of less than 1.9m extends about 4 miles WNW from the W extremity of Laeso; the outer W part of the reef is steep-to. A lighted buoy is moored off the extremity of the reef, and marks the wreckage of the former light structure, with a depth of 4.1m and close E.

Byrum Church stands 4 miles E of the W extremity of Laeso. It has a prominent steeple, 30m high.

Vestero Havn (57°18'N., 10°56'E.) is a small fishing and ferry harbor protected by two breakwaters. Vessels up to 70m in length, 12m beam, and 3.4m draft can be accommodated. Local knowledge is required. A prominent church, with a red steeple, is situated in the town close S of the harbor.

Nordre Ronner, on the N side of Ronnerev, consists of a group of grass-covered islets. Langholm, the E most islet, is about 3m high, and Spirholm, in the middle of the group, is about 2m high. A main light is shown from a prominent tower, 18m high, standing on Nordre Ronner, about 4 miles N of Vestero Havn.



NORDRE RONNER LIGHT FROM W

Borfeld, a reef with a depth less than 2m, extends about 2 miles SW of Spirholm and is marked on its N and SW sides by buoys. A 0.6m patch lies about 1 mile NE of Spirholm.

North side of Laeso.—The 20m curve forms the N side of a large bank, with irregular depths, extending N from Laeso.

This bank extends farthest offshore in its NE part, where it extends about 10 miles N of Syrodde, the NE point of Laeso.

Tonneberg Banke, with depths of 11 to 15m forms the NE part of this bank.

Laeso Trindel, a steep-to, rocky patch, with a depth of 3.8m, lies about 7 miles N of Syrodde, and is one of the most dangerous shoals in the Kattegat. Laeso Trindel Lighted buoy is moored about 0.5 mile E of this shoal.

Route T Lighted buoy No. 3 (57°28'N., 11°25'E), equipped with a racon, is moored about 6 miles ENE of Laeso Trindel.

Laeso NE Flak, with depths of less than 10m, extends about 4 miles NNE from Syrodde. The NE extremity of this bank is steep-to. A shoal, with a depth of 5.6m, lies near the NE end and is marked by a lighted buoy. Strong currents have been experienced in the vicinity of this buoy.

Osterby Havn (57°19'N., 11°08'E.) (World Port Index No. 30425) is a small fishing and yachting harbor. It lies 2 miles W of Syrodde and is protected by two breakwaters. Vessels up to 50m in length, 10m beam, and 3.3m draft can be accommodated. Local knowledge is advised.

Jegenshoj, located 1 mile ENE of the harbor, is fronted by foul ground which terminates in Engelskmandsbanke. This bank lies about 1.2 miles NNE of the harbor and has a depth of 4.3m. Phonixgrund, with a depth of 1.8m, lies about 3 miles WNW of Osterby Havn.

The N coast of Laeso offers excellent shelter from all winds except those from the N. Good anchorage can be obtained within Jegans Bugt, a bay lying W of the entrance to Osterby Havn. The roadstead has depths of 7m, stones.

Caution.—Vessels not intending to anchor off Laeso should not approach the N coast of the island within depths of less than 20m, when the weather is bad.

A danger area, with a radius of 150m, lies centered about 0.7 mile NW of Osterby Havn and may best be seen on the chart. Anchoring and fishing are prohibited within this area due to the presence of mines.

7.8 Southeast and south sides of Laeso.—The SE and S sides of Laeso are fronted by a large nearly dry sandflat, with

depths of less than 1m extending up to 3.5 miles from the island. Hornfiskron, a flat, sandy island, lies on this flat, and off the S extremity of Laeso.

Sondre Ronner, on the SW edge of the flat, about 3 miles SW of Hornfiskron, consists of several rocks, one of which is always awash; a group of rocks with depths of 1.8m, lies about 2 miles farther SW.

Knallen, with a depth of 3m, and Mellemgrund, with a depth of 2.8m, lie about 1 mile SE, and about 2 miles SSE, respectively of Syrodde.

Kobbergrund, consisting of a number of small sandbanks, with depths of 2.5 to 3.4m, extends about 8 miles SSE from a position about 5 miles SSE of Syrodde. It is one of the most dangerous shoals in the Kattegat.

Kobbergrund, Knallen, and the intervening shoals form an almost continuous shoal area with depths of less than 5.5m.

The outer edge of this area extends about 12 miles SSE from a position about 1 mile E of Syrodde.

The E side of this area is steep-to with depths of 10m, and is marked by buoys. Kobbergrund E Lighted buoy is moored about 2 miles E of the S end of Kobbergrund.

Depths between 5.5m and 10m extend about 10 miles farther SSE from Kobbergrund.

A shoal area with depths of less than 10m lies farther W, extending to about 21 miles S of Laeso.

Silderon, consisting of several rocks with a least depth of 0.6m, lies about 5 miles S of Hornfiskron. A shoal, with a depth of 1.3m, lies about 2 miles NW of Silderon.

Sondre Ronner Flak, with depths of less than 5.5m, extends about 5 miles SW, and about 7 miles S, respectively, of the W extremity of Laeso. A detached 5m rocky patch, lies about 9 miles SSW of the same extremity.

Anchorage can be obtained by small vessels in the lee of the various banks and shoals off the SE and S sides of Laeso.

There is also good anchorage for small vessels S of Laeso NW Rev. This roadstead off the W side of the island has depths of 5 to 15m, sand and pebbles with good holding ground.

A conspicuous radio mast stands, at an elevation of 154m, in the SE part of the island, about 2.2 miles ENE of Byrum Church.

A meteorological survey mast, 60m high, is reported (1999) to stand about 14 miles S of Syrodde.

Anholt (56°43'N., 11°34'E.)

World Port Index No. 30423

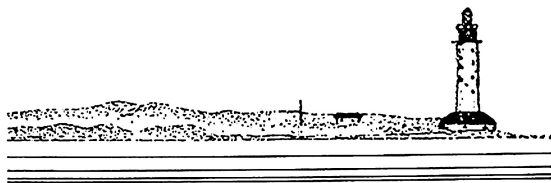
7.9 The island of Anholt lies about 35 miles SSE of Laeso and approximately 25 miles NE of Fornæs. Just as it is with Laeso, Anholt is surrounded by dangerous shallows and reefs, where many places project far out from the coast.

A Nature Reserve is established onshore and extends about 0.4 mile seaward, from N through E to WSW, of the NE point of Anholt. Entry into the area is prohibited, mariners are cautioned to give this area a wide berth.

The fairway between the curves of Laeso and Anholt is named Sanden; there are several shoals with depths from 1 to 9m. The W part of Anholt rises from a narrow sandy foreshore to sandhills that can reach a height of over 30m.

Nordberg, 39m on the NW extremity of the island and Sonderbjerg, 48m high, on the SW extremity are the highest sandhills. About 1 mile from the W coast the land becomes lower and all of the E part of the island consists of low sand dunes. There are no trees on the island.

Anholt Light ($56^{\circ}44'N.$, $11^{\circ}39'E.$), a tall round tower, marks the E end of the island.



ANHOLT LIGHT BEARING W

Depths—Limitations.—Osterrev, a narrow sandspit on which there are some boulders, extends about 4 miles E from the E extremity of Anholt.

The inner end of this spit reportedly dries. Koppergrund, the middle part, has rocks with depths of 1.2m.

The outer end, known as Knoben, has depths of 3.7 to 6.2m. Osterrev is steep-to on its N side and E end; the latter is buoyed.

A coastal bank, with depths of less than 5.5m, surrounds Anholt. This bank extends about 5 miles NW from the NW extremity of the island, and about 4 miles WSW from the SW side; on the N side it extends about 1 mile offshore, but on the

SE side it is very narrow, with depths of 20m being found about 0.5 mile offshore.

Stensore, a rock with a depth of 3.1m, lies about 2 miles W of the SW extremity of Anholt.

Anholt SW Lighted buoy is moored off the SW extremity of the coastal bank which extends SW of Anholt, and about 5 miles SW of Sonderbjerg.

Nordvestrev, a narrow reef, extends about 5 miles NW from the NW extremity of Anholt. There are depths of 1.6 to 1.9m on the outer part of the reef, and the inner part dries. A buoy is moored about 3 miles NW of the outer end of Nordvestrev.

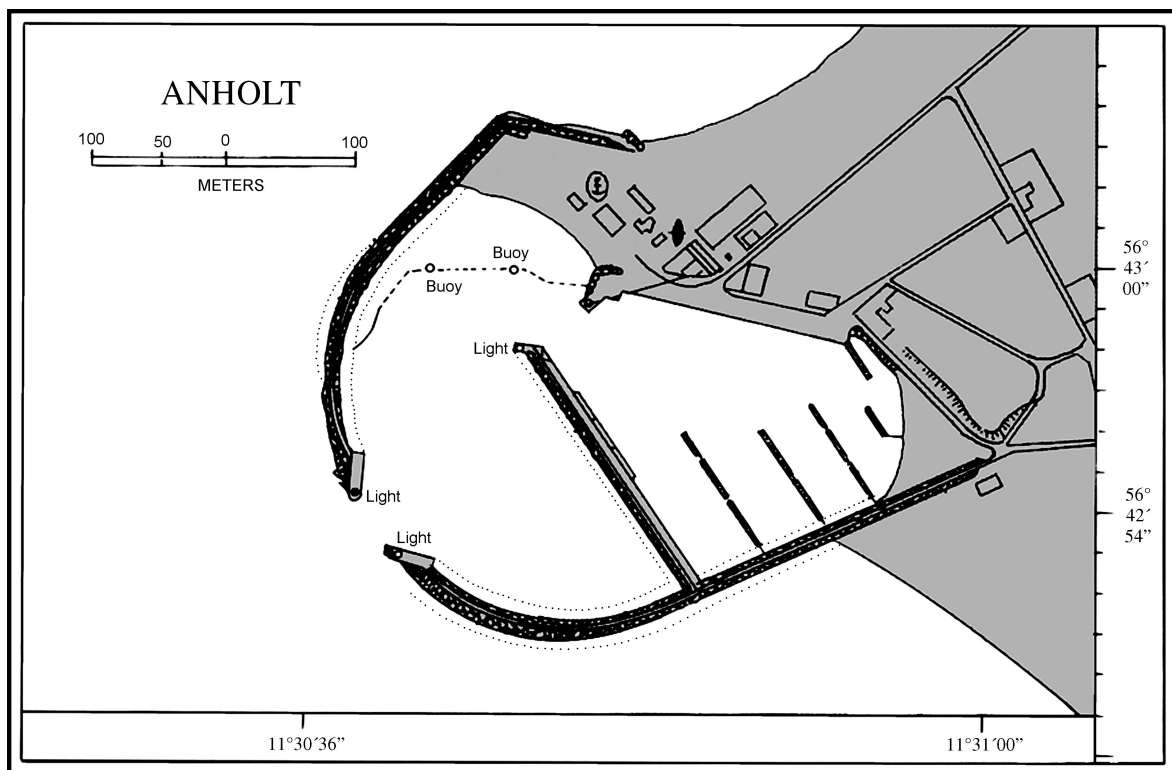
Anholt Havn, on the W side of the island, is formed by two curved breakwaters, and consists of an inner and outer harbor.

There are depths of 3.7m in the greater part of the harbor and in the entrance. The entrance is subject to silting. The harbor can accommodate vessels up to 75m in length, 15m beam, and a draft of 3m.

The water level can be raised about 1m by W storms, and lowered about 0.8m by E storms. The current outside the harbor entrance usually sets N, and only sets S during NW or N storms, at which time the water level is very high.

Three beacons on the W side of the harbor aid in the approach to the harbor. These beacons, in range with the light structure on the N breakwater head, mark the N, middle, and S limits of the approach channel. There is a least depth of 4.2m in the N approach, and the S range leads over depths of 3.4m.

Aspect.—In addition to Nordberg and Sonderbjerg, the following are prominent: Anholt Church, situated on the W part of the island has a white spire but can only be seen from the S; Ostebakke, a 24m high sand hill is conspicuous, and is situated about 2 miles NNE of Sonderbjerg.



Signals.—In special circumstances, when it may be necessary to prohibit vessels from entering or leaving the harbor, signals will be shown from a flagstaff on the small mole on the N side of the entrance of the inner harbor.

By day, two black cones, points together, over a ball. By night, a white light, with a green light above it, and a red light below it.

Anchorage.—Large vessels can anchor off the N side of the island in depths of 8 to 12m. In Pakhusbugt, on the SE side of the island, anchorage can be taken in depths of 20m. Small vessels can anchor off the W side of the island, but large vessels must anchor so far offshore that the island offers little shelter from the sea raised by E winds. Vessels using these anchorages should be prepared to get underway if the wind shifts and comes onshore.

Caution.—Several areas in which anchoring, fishing, or seabed activity could be dangerous owing to mines lie within 7 miles S and SW of Anholt; similar areas lie 2 miles NNW and 14.5 miles SSW of the island.

In 1991, a dangerous mine was reported to exist in a position approximately 1 mile SSW of Anholt E Point light-structure. Anchoring, fishing, and trawling is prohibited within the radius of 0.5 mile from the position.

Hesselo and Off-lying Shoals

7.10 Hesselo (56°12'N., 11°43'E.), is a small island, located about 32 miles S of the E extremity of Anholt.

This island, almost uninhabited, is marked by a light on its highest part. The island and the sea area within 3 miles form a conservation area within which wild animals and birds are protected. Traffic is prohibited over the reefs between 15 April and 30 September.

A reef, on which there are some awash rocks, extends about 2 miles NW from the NW extremity of the island; a buoy is moored close NW of the reef.

A narrow sandspit, with depths of 0.6 to 3m, extends about 1 mile SE from the SE end of the island; on the outer end of the spit is a rock, on which the sea may break during storms. A lighted buoy is moored off the extremity of the spit.

A 5.6m rocky patch lies about 0.5 mile N of the island, and a 9m rocky shoal lies about 1 mile NNW of the NW extremity of the island. Vessels navigating in this area should not approach the island within a depth of 20m.

Lysegrund

Lysegrund is marked NE and shoalest part by **Lysegrund Light** (56°18'N., 11°48'E.) about 7 miles NNE of Hesselo.

The bottom of this dangerous shoal consists mainly of sand, with scattered patches of weed, but in depths of less than 4m there are rocks.

The discoloration over the shoal can usually be seen from a short distance.

A rock, with a depth of 5m, lies about 0.4 mile NNE of Lysegrund Light. Depths of 4.1m lie about 1 mile SSE, and 1.5 miles S, of the same light-structure.

Depths of less than 10m extend to about 3 miles SW and WNW, respectively, from Lysegrund Light. Buoys mark the NW and SW extremities of the shoal.

Lille Lysegrund (56°18'N., 11°30'E.), a rocky shoal 9 miles NW of Hesselo has a depth of 7.6m.

No. 8 light-buoy is moored on the 20m depth contour 2.5 miles NW of Lille Lysegrund; it marks the E side of Route T where this leads between the shoal and Brieis Flak.

Eastern and Western Channels

The principal access from the North Sea to the Belts and The Sound and then to the Baltic Sea is through the Eastern and Western Channels.

The route taken by large vessels follows the Eastern Channel as far S as Anholt and then crosses Kattegat passing SE of that island to form the S end of the Western Channel where it then leads through Samso Belt to Store Baelt.

Alternately, the E channel may be followed farther S to No. 11 Lighted Buoy (56°15'N., 12°15'E.), off the N entrance to The Sound, and Kattegat crossed S of Hesselo; this route across Kattegat is not marked by buoys.

Eastern Channel.—The Eastern Channel in the Kattegat is the passage E of the islands and shoals in the middle of the Kattegat. The passage commences as a broad stretch of water, which lies E of the sand bank, with depths of less than 37m extending out from Aalbaek Bugt.

Dybe Rende (57°45'N., 11°20'E.), a deep with depths from 75 to 110m, lies from 4 to 8 miles off the outer islands off the Swedish coast and extends from the Skagerrak to the parallel of Yttre Tistlama. The bottom of this deep is clay.

The passage continues farther S between the Swedish coast and the shoal area of the W part of the Kattegat, on the E side of which lie Laeso and Anholt. The 35m curve indicates the boundary of this passage. The bottom is very irregular with a number of sandbanks and shoals S of Anholt.

In the S part of the passage, the bottom consists of mud and blue clay in depths over 28m. In lesser depths, such as towards the coast of Sjaelland, the bottom consists of sand and shells; farther inshore, coarse sand and gravel are found.

7.11 Eastern Channel—Banks and Shoals.—**Kummelbanke** (57°28'N., 11°25'E.), about 11 miles NE of Syrodde, has a least depth of 23m, rock, the bottom on the remainder of the bank, which is steep-to on its E side, is sand and shingle. Laeso Trindel lightship is moored on Kummelbanke.

Bochers Banke, about 3 miles farther S, has a least depth of 20m, over gravel and small stones; the bank is steep-to on its E and S sides. Areas in which anchoring, fishing or seabed activity could be dangerous owing to mines lie on Bochers Bank, and 4 miles ENE.

Groves Flak is an extensive bank lying to the E of Sanden from which it is separated by a narrow deep in which there are depths up to 95m. Depths over the bank are generally less than 35m, the least depth of 12.8m being found near its S end.

Close S of Groves Flak is a large bank with a least depth of 12.8m.

Fladen, lying E of Groves Flak, is separated from it by a narrow channel in which there are depths from 40 to 60m. The least depth of 5.9m, exists near the center, but there are other shoals and patches.

Fladen Light (57°13'N., 11°50'E.), marks the E side of an 8.7m rocky patch near the NE end of Fladen.

The bottom in waters N of Groves Flak and Fladen, where the depths are 55 to 95m, consists of mud and clay.

Lilla Middelgrund shoals gradually from its NW side to a rocky ridge on its E part. This rocky ridge, about 16 miles NE of Anholt, with least depths of 5.5m over its rocky E part extends in a NE to SW direction. A lighted buoy is moored on the E side of Lilla Middelgrund.

Morups Banke, with a least depth of 12m, stones, and steep-to, lies about 5 miles WSW of Morups Tange (56°55'N., 12°22'E.).

Stora Middelgrund (56°33'N., 12°06'E.) lies about midway between Anholt and Kullen. The least depth on Stora Middelgrund is a 6.6m rocky patch, the E of several rocky patches with depths of less than 10m.

For navigation of the various routes through the Kattegat and to the ports, reference to the latest charts should be consulted with the selection depending primarily on the draft of the vessel.

Transit Route T, with connecting deep water route zones and traffic schemes, has been established from Skaw via Store Baelt to the Baltic Sea. Route T is available for vessels with a draft up to 17m; however, depths may be up to 2m less than charted owing to unknown and moving obstructions, and may be further reduced by Meteorological or other effects.

Swedish Coast.—Hallandsasen, a range of mountains bordering the S side of Laholms and Kullen, are the only high lands on this part of the Swedish coast. They run parallel and about 13 miles from each other, thus making it possible to mistake one from the other, and causing a vessel to enter Skalderviken, instead of The Sound.

It should be observed that Hallandsasen has long hills with evenly declining slopes, whereas the range, terminating at Kullen, has several short steep hummocks with steep cliffs, which may appear as three steep islands from a distance.

On closer approach, Kullen light-structure on the outermost hummock, which is longer than the others, will be seen.

Western Channel.—The Western Channel is the passage W of the islands and shoals in the middle of the Kattegat.

As depicted on the chart, the passage commences E of Skagen and crosses the broad flat, with depths from 20 to 30m, which lies E of Aabaek Bugt.

On the SE side of this flat, a deep, with depths over 37m extends SW from the Eastern Channel.

Herthas Flak (57°38'N., 10°52'E.), a shoal with a least depth of 9.2m, lies about 10 miles SE of Skagen Light.

The channel leads S between **Dvalegrunde** (57°13'N., 10°39'E.) and the shoals extending W from Laeso; this part of the channel is known as Laeso Rende.

The least depth in Laeso Rende is 12m, about 2 miles SW of the outer extremity of Laeso N.W. Rev.

As this channel trends S, it widens S of Laeso and the depths decrease rapidly below Laeso Rende. The bottom is found to be very irregular particularly where a number of shoals obstruct the channel.

Ostre Flak (56°58'N., 10°55'E.) has a least depth of 6.2m; Ostlige Knold has a least depth of 6.5m; Vestlige Knold

indicates a least depth of 6.2m and farther W, Langerevle consists of a line of shoal patches, with depths from 6.9 to 7.2m.

Caution.—With these restrictions and depths less than charted due to isolated rocks protruding from the bottom, large vessels would have difficulty navigating in this area.

To the S of the above shoals, the depths increase to 11 and 15m. Between **Tangen** (56°36'N., 10°45'E.) and Anholt, the depths are over 11m.

The eastern passage, proceeding S past **Fornaes** (56°26'N., 10°58'E.), has depths increasing to over 18.3m. Southward of Fornaes, the E side of the passage is bordered by Briseis Flak, Hastens Grund, Schultz's Grund, and Sjaellands Rev.

The W side is bordered by the shoals extending off **Hjelm** (56°08'N., 10°49'E.).

7.12 Briseis Flak, about 14 miles ESE of Fornaes, has a least depth of 4.4m. The bottom on this shoal is mainly light-colored sand, gravel, and stones; on the S side there is brown sand with black specks. A buoy marks the SW end of the shoal; No. 9 Lighted buoy is moored on the 20m depth contour 3.5 miles ENE of the shoalest part of Briseis Flak.

It marks the W side of Route T where this leads between Briseis Flak and Lille Lysegrund.

Hastens Grund, about 15 miles SE of Fornaes, has a least depth of 1.6m, and consists of a number of patches with depths of less than 5.5m. The bottom is mostly gravel, but in some places is fine sand and rock. A buoy is moored about 1 mile NNW of its least depth.

A wreck is located off the shoal on the E side of Hastens Grund.

An area in which anchoring, fishing or seabed activity could be dangerous owing to mines lies between Briseis Flak and Hastens Grund, and there is another such area 2 miles farther NW.

Schultz's Grund, lying S of Hastens Grund, has a least depth of 3.5m about 4 miles N of Sjaellands Rev N Light, 56°06'N., 11°12'E.; a buoy is moored S of the least depth.

An 11m bank, with its S extremity about 3 miles WNW of Sjaelland Rev N Light, lies SW of Schultz's Grund.

The passage continues S on either side of Yderflak, a shoal with depths of less than 11m. This shoal has a least depth of 6.7m which is marked by a light, about 7 miles WSW of Sjaellands Rev N Light.

Caution.—Areas in which anchoring, fishing, or seabed activity could be dangerous owing to mines lie across the N end of Yder Flak, and 5 miles WNW of the NW end of Sejero. Also other such areas exist between Briseis Flak and Hastens Grund and an area 2 miles farther NW.

The channel continues S between Middelflak and the shoals W of Sejero, then E of Hatter Barn; vessels of over 8m draft use the deep channel between Hatter Barn and Hatter Rev, close N. The channel then continues S, passing W of **Rosnaes** (55°45'N., 10°52'E.), and proceeding S to Store Baelt, or W to Lille Baelt.

Middelflak (55°56'N., 10°55'E.), a rock shoal, has a least depth of 4.7m formed over a wreck. Munke Grunde, close N, has a least depth of 4.3m. A 6.9m depth, on the E side of

Middelflak, lies about 5 miles W of the NW extremity of Sejero. Depths of about 6.1m lie about 2 miles W and NW of the NW extremity of Sejero.

Leveret, a series of shoals, has a rock with a depth of 6.8m at its W extremity, about 5 miles WSW of the N extremity of Sejero. A 7.6m depth, about 0.5 mile E of the rock, is marked by a lighted buoy, which marks the W side of a deep channel through Leveret. A 5.6m depth, lies about 3 miles farther ESE.

Hatter Barn (55°53'N., 10°51'E.), is a shoal with a least depth of 4.8m at its N extremity. A light is shown on the NW side of the shoal. A 5m patch, in the S part of the shoal, is marked by a buoy.

Hatter Rev, close NW of Hatter Barn, has a least depth of 1.8m, and is marked by a light off its SE extremity, and a buoy off its S side. A racon is located at the light.

Lights in range, near the W extremity of Samsø, lead through the deep channel between Hatter Barn and Hatter Rev.

A 7.7m depth lies about 3 miles S of Hatter Barn.

7.13 Navigation through Western Passage from the N, in clear weather should not meet with difficulties, as during the day, Hirsholm, Frederikshavn, the church and water tower at Sæby, and other landmarks provide good guides.

At night Skagen, Hirsholm Light, Nodre Ronner Light, and Laeso N.W. Lighted buoys are good marks.



HIRSHOLM LIGHT BEARING ABOUT 169°

Directions.—Route T.—From Lighted Buoy No. 1 (57°47'N., 10°46'E.), moored NE of Skagens Rev, Route T, the main track, leads about 30 miles SE to lighted buoy No. 3 (57°28'N., 11°25'E.), which is equipped with a racon. It continues SSE for 45 miles, passing E of Anholt, to Lighted Buoy No. 6 (56°45'N., 11°53'E.), which is equipped with a racon.

The track then leads SSW for 52 miles. It crosses Route B and passes NW of Sjaellands Rev Light, which is equipped with a racon. About 6 miles SSW of this light, the track joins Route A at Lighted Buoy No. 13 (56°01'N., 11°05'E.). It then continues SW and forms the principal track for large vessels passing through the Samsø Bælt and entering the N part of the Storebælt (Great Belt). This track includes a Deep-Water Route and a Traffic Separation Scheme (TSS), which may best be seen on the chart.

Route B.—From Lighted Buoy No. 1 (57°47'N., 10°46'E.), Route B leads S for 32 miles, passing W of Laeso, and SSE for 18 miles to Lighted Buoy No. 6 (56°58'N., 10°52'E.). It continues SSW for 7 miles to Lighted Buoy No. B7 (56°51'N., 10°48'E.).

The track then leads 56 miles SE to Lighted Buoy No. 10 (56°18'N., 12°04'E.). It passes SW of Anholt and crosses Routes E, A, and T. From Lighted Buoy No. 10, Route B leads SE for 18 miles and enters The Sound.

Route D.—From Lighted Buoy No. 6 (56°45'N., 11°53'E.), equipped with a racon, Route D leads SSE for 29 miles and joins Route B at Lighted Buoy No. 10 (56°18'N., 12°04'E.).

Route A.—From Lighted Buoy No. 6 (56°45'N., 11°53'E.), equipped with a racon, Route A leads 34 miles SE to Lighted Buoy No. 4 (56°24'N., 11°06'E.). It passes SE of Anholt and crosses Route B.

From Lighted Buoy No. 4, the track leads 23 miles S and joins Route T at Lighted Buoy No. 13 (56°01'N., 11°05'E.).

Route F.—Route F leads 7 miles SW from Lighted Buoy No. B7 (56°51'N., 10°48'E.) to Lighted Buoy No. 2 (56°41'N., 10°38'E.). It then leads 13 miles SE and SSE to join Route A at Lighted Buoy No. 4 (56°24'N., 11°06'E.).

Route C.—From Lighted Buoy No. B7 (56°51'N., 10°48'E.), Route C leads 33 miles E from Route B to join Route T at Lighted Buoy No. 5 (56°51'N., 11°49'E.).

Route E.—From Lighted Buoy No. B7 (56°51'N., 10°48'E.), Route E leads 13 miles E from Route B (along Route C) to Lighted Buoy No. 3 (56°51'N., 11°12'E.). It then leads 27 miles SSW to join Route A at Lighted Buoy No. 4 (56°24'N., 11°06'E.). The track passes W of Anholt and crosses Route B.

All of the above routes and navigational aids may best be seen on the chart.

Caution.—The approach to Store Bælt is not recommended for large vessels in foggy conditions; smaller vessels should not experience any difficulty.

North Coast of Sjaelland

Sjaelland is the largest island in an archipelago which stretches between the Swedish coast and Jylland. The Sound lies off the E side of this island and the Store Bælt lies off the W side. A considerable amount of traffic uses these two passages. The N coast of this island, which lies at the S end of the Kattegat, extends between Gilbjerg Hoved and the peninsula of Rosnaes, 53 miles WSW.

Isefjord is entered about 18 miles WSW of Gilbjerg Hoved. Sjaellands Odde, a narrow peninsula extends about 10 miles WNW from the middle of the coast. Sejero Bugt with Sejero in its middle part is formed between Sjaellands Odde and Rosnaes.

Gilbjerg to Isefjord.—**Gilbjerg Hoved** (56°08'N., 12°18'E.), the W entrance point of the Sound, is a high steep cliff, lacking any tree growth and rising to 33m. The land becomes lower between the point and the fishing village of Gilleleje, about 0.7 mile ESE. At this point, some good marks are a prominent church with a black spire, a hotel and a water tower.

A 6.2m rock, about 2 miles N of Gilbjerg Hoved, is the N danger of Gilleleje Flak; a lighted buoy is moored about 0.7 mile N of this rock. A detached 9.5m patch lies 2.25 miles NNW of Gilbjerg Hoved.

Aspect.—Just to the W of Gilbjerg, the coast is quite low until N of Blistrup and then it rises to steep, light colored cliffs until close NE of Tisvilde.

Tisvilde Hegn, a large wooded area, is conspicuous SW of the latter village.

The coast SW of Tisvilde is low until it rises steeply at the high and prominent **Spodsbjerg** (55°59'N., 11°52'E.); a light is shown on Spodsbjerg.

Other good marks on this coast are: Blistrup Church, surrounded by trees, about 4 miles SW of Gilbjerg Hoved, and

Vejby Church and Tibirke Church, about 3 and 4 miles, respectively, farther W; Salgardshøj (Salguarshøj), a hill, 49m high, about 3 miles W of Blistrup; Torup Church, about 3 miles E of Spodsbjerg, and Melby Church, about 1 mile farther NE.

An explosive dumping area is centered about 6 miles WNW of Gylbjerg Hoved, and is defined by 4 black and yellow buoys.

All navigation by unauthorized vessels is prohibited in the area.

Also offshore, moored about 3 miles out, between Tisvilde and Spodsbjerg, there are black and yellow buoys that indicate firing practice areas.

On this part of the coast E of the Isefjord entrance, there are a number of off-lying dangers. Bagerivnen, a rock with a depth of 5m, lies about 1 mile offshore NNW of Salgardshøj.

A 5m rocky shoal lies about 2 miles NNE of Spodsbjerg. A rocky patch, with a depth of 5.3m, lies about 2 miles farther NNE.

7.14 Isefjord to Sjaellands Rev.—Isefjord entrance lies between Spodsbjerg and **Korshage** (55°59'N., 11°47'E.), a low sandy point, about 3 miles W. Grønnerevle, a large bank with depths of less than 5.5m, extends to about 2 miles offshore around Korshage, and E to within 1 mile of Spodsbjerg.

The shallowest part of the bank is a ridge extending about 1 mile N of Korshage, and with a depth of 2.2m at its outer end. Grønnerevle is marked N by a buoy moored about 3 miles NNE of Korshage.

Nyrup Bugt is entered between Korshage and Klintebjerg, a steep 35m elevation, about 6 miles WSW. The shore of the bay is low and sparsely wooded. Foul ground with depths of less than 5.5m prevails throughout most of Nyrup Bugt. Skjaerebaek Rev, in the middle of the bay, has a least depth of 0.9m.

Large vessels should not approach Nyrup Bugt in depths less than 10m.

Sjaellands Odde, the peninsula forming the NW extremity of Sjaelland, is mostly low but has a few hills. Near the inner end of the peninsula, Lumbsas Church and Mill are quite conspicuous, as is the highest hill, at 55°58'N, 10°30'E, in this area.

Odden Havn (55°58'N., 10°22'E.) is a very small fishing harbor. Yderby Mill (without sails) is conspicuous about 1 mile W of Odden Havn. Odden Church and Overby Mill, close SW, are also conspicuous about 1 mile SW, of the fishing harbor.

Sjaellands Rev, a narrow and dangerous reef, extends about 5 miles NNW from **Gniben** (56°01'N., 11°17'E.), the NW extremity of Sjaellands Odde. The sea breaks on all parts of this reef with the least wind, and in calm weather the outline of the reef can be seen from a considerable distance due to the race which shows on the side opposite to that against which the current is flowing.

Inderrevet, the inner part of the reef, extends about 2 miles N of Gniben, and is a rocky ridge, with depths of less than 4m.

The E side of Inderrevet is fairly steep-to, but on the W side the depths increase regularly to 6m about 1 mile from the reef.

Mellemrevet is a very narrow rock ridge, about 1 mile long and with depths of 2 to 3.4m; it is separated from Inderrevet by Snekelob, a narrow channel with depths over 7.5m but obstructed at its E end by two 3.4m rocky patches. This

channel may be used by vessels with a draft of less than 3.4m, and with local knowledge.

Yderrevet, the outermost section of Sjaellands Rev, is a narrow ridge, nearly 3 miles long, which dries over a considerable part. The W side is steep to, and there are several rocky patches with depths of 3.3 to 5.3m off the E side.

A wreck with a depth of 15.8m, lies in approximate position (56°02'N., 11°10'E.).

A refuge beacon 7m in height stands on Yderrevet, 0.5 mile SSE of the light beacon.

Sjaellands Rev Light (56°05'N., 11°13'E.) is shown from the N end of Yderrevet. A refuge beacon, 7m in height, consisting of a red tower surmounted by a gray house, is located about 0.5 mile SSE of the light. The room on the beacon will accommodate six to eight people, and is supplied with provisions, blankets, etc.

Sjaellands Rev N Light (56°06'N., 11°12'E.) is shown from a round white tower with a red band, about 1 mile NNW of the N extremity of Sjaellands Rev.

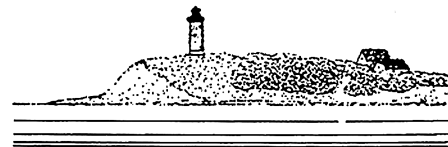
Anchorage can be taken by large vessels about 3 miles SW of Sjaellands Rev N Light.

Northwest Coast of Sjaelland

7.15 Sejero Bugt, a large bay entered between Gniben, the NW extremity of Sjaellands Odde, and Rosnaes, 21 miles SW, is divided into two parts by Sejero, an island in the middle of the bay. The bay is navigable by large vessels and has good anchorage. It is however, little used as Havnso is the only sheltered port where cargo can be worked.

The S side of Sejero Bugt is low and woodless in its E part, but rises in its W part to the bare 61m high hills on the peninsula of Rosnaes.

The island of Sejero is marked by a light (55°55'N., 11°05'E.), and the church near the middle of the island is conspicuous.



SEJERO LIGHT BEARING ABOUT 056°

Kongshøj (55°52'N., 11°12'E.), a conspicuous hill, 30m high is located near the SE extremity of the island.

Sejero Havn, midway along the SW coast of the island, consists of a basin, formed by two breakwaters and entered from SE. There are depths of 3.3m in the entrance and 3m on the inner side of the breakwater. Northerly winds may raise the water level 0.8m, and S winds may lower it the same amount.

A new mole and ferry berth was under construction close E of Sejero Havn.

Sejero NW Rev with depths of less than 5.5m and marked NW by a buoy, extends about 1 mile NW of the island. Sejro Puller, with depths of 6.1m and 6.2m lie about 2 miles NW and W, respectively, of the NW extremity of the island.

Sejero SE Rev extends about 2 miles SE from the SE extremity of the island; midway along this reef there is a depth of 0.3m. Kolen, with a depth of 0.9m and steep-to, lies at the SE extremity; a buoy is moored SE of Kolen, and on the W side of a narrow but deep channel leading into Nekselo Bugt.

Several rocky patches are in evidence on the coastal bank off the outer part of Sjaellands Odde. Abatros, the outermost rocky shoal with a depth of 2.8m, lies 2 miles SW of Gniben.

Sjaelland Odde Ferry Harbor, situated 3.25 miles SSE of Gniben, is the terminal for the car ferry from **Ebeltoft** (56°09'N., 10°40'E.) in Jylland, for whose use it is reserved.

Aspect.—The following landmarks are conspicuous in addition to those described with Sjaellands Odde: **Sekshoje** (55°55'N., 11°35'E.), a 51m hill; Skamlebaek radio masts, about 2 miles ESE of Ordrup Naes; Brendeshoj, a 92m hill, about 2 miles farther E; and Hove Mill about 1 mile ESE of Brendeshoj.

Ordrup Naes, a protruding cliff, has a spit extending about 3 miles W; a 2.2m patch lies near the outer end of the spit. A buoy is moored about 183m W of the latter patch.

7.16 Knarbo Klint, 20m high, lies close to the coast, about 2 miles SSE of Ordrup Naes. Then the land rises to Vejrhøj, 121m high, about 1 mile farther SSE, the S-most and highest hill in the vicinity.

Havnsø Havn (55°45'N., 11°20'E.) on the S shore of Nekselo Bugt, consists of a small basin protected by breakwaters. The entrance is in the NE corner, facing ESE.

The basin is accessible to vessels 30m long, and 10m in beam.

There are depths of 3.5m in the entrance and in the E part of the harbor.

Havnsø Mill, close W of Havnsø Havn, and the castle at Dragsholm, about 3 miles ENE, are conspicuous landmarks.

The N entrance to Nekselo Bugt is marked by lights in range 175°, located on the N side of Nekselo.

The range leads between Kolen and then on to the spit extending W from Ordrup Naes, but passing close W of a 5.3m patch.

When Sejero Church bears about 300° and open S of Kongshøj, course should be altered SSW to clear a 3.8m rock in the entrance to Nekselo Bugt.

The coast from Nekselo to Rosnaes is low and unwooded; the E part is low inside the coast and the W part rises to bare hills which can rise up to 63m.

The peninsula of Rosnaes terminates W in a narrow cliffy point, which is the W extremity of Sjaelland and the NE entrance point of Store Bælt.

Aspect.—Conspicuous on the S side of Sejero Bugt are: Windmills, close together at **Vroj** (55°45'N., 11°08'E.);

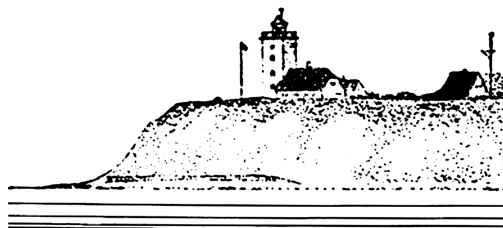
Raklev Church, situated on high ground about 4 miles SW of Vroj; and the lighthouses of Rosnaes and Rosnaes Puller.

Anchorage.—Anchorage, depending on the direction of the wind is good in parts of Sejero Bugt.

In particular vessels can anchor in depths from 5.5 to 7.5m, good holding ground off **Overby** (55°57'N., 11°24'E.). There are depths of 7.5m off the E side of Nekselo and on both sides of Sejero.

Caution.—Areas where anchoring, fishing, or seabed activity could be dangerous due to mines, lies close SW of the SE extremity of Sejero, and 2 miles SE of Sjaellands Odde Ferry Harbor and on the E side of Sjaellands Rev.

Rosnaes Light (55°45'N., 10°52'E.) marks the extremity of Rosnaes. The reef here extends about 0.5 mile from the extremity with depths of 2.4m at its outer end, and a drying rock lying near the middle of the reef. Other dangers include the rocks with depths of less than 5.5m that lie up to 0.5 mile N of Rosnaes Rev.



ROSNAES LIGHT BEARING ENE

Rosnaes Puller Light (55°45'N., 10°51'E.), located about 1 mile WNW of Rosnaes Light, is shown from the NW part of Rosnaes Puller. Rosnaes Puller, on which there are several large rocks with depths from 2.2 to 4.7m, is separated from the reef of Rosnaes by a narrow channel. The latter channel, marked by buoys has depths from 6.5 to 6.7m in the fairway.

Depths of less than 17m extend 1 mile NW and W from Rosnaes Puller Light. A shoal, with a depth of 15.7m, lies 1.75 miles of Rosnaes Puller Light; it is marked on its E side by a buoy. Shoals, with depths of 12.2m and 12.7m, lie 0.6 mile NW and 0.4 mile WNW, respectively, of the light. A depth of 11m, 2 miles S of the light is marked 0.6 mile NE by a buoy.

7.17 The entrance of **Isefjord** (55°59'N., 11°51'E.), obstructed by sand banks consists of three channels. Southward of the entrance, the fjord expands into Yderbredning, an extensive basin. The island of Oro, at the S end of Yderbredning is bordered by Oro Østre Lob and Oro Vestre Lob, channels on its E and W sides, respectively, which lead to Interbredning.

Tides—Currents.—The range of tide in Isefjord and its branches is small. The difference between mean high water and mean low water is about 0.2m, and greater at the spring equinox. In stormy weather the difference can rise to 1 to 1.5m at Rorvig, and somewhat less at Nykobing Bugt and Holbaek Fjord. The tidal currents, which are normally of slight velocity, change their direction regularly during settled weather, but in stormy weather they may set in the same direction for 18 hours or longer.

Northerly or southerly gales drive large masses of water into, or out of, the fjord, but only in the narrow passages, the direction in which the current follows, is any considerable velocity attained. The currents caused or accelerated by these strong winds may attain a rate of 1.5 knots in the channels through the entrance of Isefjord.

The ingoing current is perceptible about 4 miles E of Isefjord entrance. In the entrance it divides into 2 main branches, one of

which sets SW through Osterlob and then turns ENE into Roskilde Fjord.

The other branch sets through Vesterlob, one portion entering the deep channel off Rorvig, and the remainder setting SE across the sandbanks toward Osterlob.

The outgoing current sets out of Roskilde Fjord, rounds Lynaes Sand, and then sets in a NE direction toward Spodsbjerg and over Grønnerevle, where it is directed E. A portion of this current sets from Osterlob, S of Middelgrund, follows the channel past Rorvig, and passes seaward across the sandbanks and along the shore.

Depths—Limitations.—The main dredged channel through the entrance to Isefjord has a depth of 6.5m with a bottom width of 70m.

Osterlob, an unmarked channel with a depth of 2.7m, and Vesterlob marked by buoys with a depth of 3.1m, are the secondary channels.

In the greater part of Yderbredning, there are regular depths of about 9.1m. Oro Vestre Lob has depths of 6.2 to 15m in the fairway. Inderbredning has fairly regular depths of 6.1 to 7.5m.

Aspect.—The E side of the entrance to Isefjord is formed by the W coast of Halsnaes, the peninsula separating the N part of Roskilde Fjord from the Kattegat. Between the comparatively high and prominent Spodsbjerg, on the NW extremity of Halsnaes, to the low SW extremity of the peninsula, about 2 miles S, the hills decrease in height and recede from the coast.

Pilotage.—Pilots can be obtained at Hundested in the entrance to the fjord where VHF watch is maintained, or from Holbaet Havn.

Regulations.—Throughout the channels and in the approaches to the ports within Isefjord, the regulations for narrow channels in Danish waters are in force with the exception that outward bound vessels must give way to those inward bound.

Caution.—The Danish Navy has practice areas for torpedo and firing and therefore special regulations are in force and lights are shown when the ranges are in use.

See Pub. 140, Sailing Directions (Planning Guide) for the North Atlantic Ocean Baltic Sea, North Sea, and the Mediterranean.

Fish traps are laid out over the shoals W of the entrance to Isefjord annually from March to June.

A submarine cable is laid across the entrance to the fjord between Hundested and Skansehage.

Spodsbjerg Light is conspicuous. Hundested Havn lies about 0.7 mile SSW of the light-structure. The small harbor of **Lynaes** (55°57'N., 11°52'E.), lies near the SW extremity of Halsnaes.

On the W side of the entrance, the coast between Korshage and Skansehage, about 2 miles SSE, is low, sandy, and covered with dunes. From the small town of Rorvig, about 0.7 mile WSW of Skansehage, the coast rises to Skredbjerg, a steep bluff, about 25m high, about 2 miles SW of Skansehage.

Then the coast declines to low Nakke Hage, about 0.7 mile farther S. Prominent on the W side of the entrance are Rovig Church, nearly 2 miles W of Skansehage, and Rorvig Mill, about 0.7 mile SE of the church.

Nykobing Church, about 3 miles SW of Rorvig Church, is also prominent. A light was established about 0.7 mile E of Rovig on the buoyed channel.

The coastal bank extending from Spodsbjerg is comparatively narrow, but S of Hundested Havn, the coast is bordered by **Korevle** (55°57'N., 11°51'E.), a sandbank with depths of less than 2m and extending up to 0.75 mile offshore.

Lynaes Sand (55°56'N., 11°49'E.), with depths from 2 to 4m, except in the dredged channel, extends W from the SW part of Korevle.

7.18 Hundested Havn (55°58'N., 11°51'E.) (World Port Index No. 29390) lies on the E side of the entrance to Isefjord.

The harbor consists of Yderhavnen and 3 fishing basins, and can accommodate vessels up to 90m in length, 14m beam, and 5m draft. There are depths of 5.5m in Yderhavnen, in the buoyed entrance channel, and alongside the berth on the NE side of Yderhavnen.

It has been reported that silting exists W of the W mole. This area is marked by a buoy.

Pilotage.—Pilotage is compulsory for oil tankers, loaded chemical tankers, and gas tankers. Pilots should be requested from SOUNDPILOT, Kobenhavn, 6 hours in advance, stating:

1. Vessel's name.
2. ETA.
3. Pilot embarkation.
4. Pilot disembarkation.
5. Maximum draft.
6. Speed.

The pilot boards in position 56°00.5'N, 11°50.0'E for vessels bound for Hundested and ports in Isefjord.

The water level at Hundested can be raised up to 1.3m by NW winds, and lowered up to 1m by SE winds.

The ferry harbor, S of Hundested, has a channel dredged to 6.5m leading to the ferry landings.

South of the ferry berths there is a quay 240m in length with a depth of 6.5m alongside. There is a ramp at the N end of the quay.

Anchorage.—Vessels can anchor in **Saetteriet** (55°57'N., 11°50'E.) in depths from 4.5 to 5.5m, sand and good holding ground, with the root of Kulhus Pier at **Kulhuse Havn** (55°56'N., 11°55'E.) bearing approximately 102° just open S of Lynaes Havn.

Winds between NW and NE send in a sea, but its force is so diminished by the outlying banks that a vessel is able to ride out a N gale at this anchorage.

In the deep channel off Rorvig, there is safe anchorage with the wind from any direction. A vessel can anchor here in 9 to 11m, clay, with Spodsbjerg in range with Skansehage.

Caution.—A vessel approaching the main channel from N or W should keep outside the 11m curve off Grønnerevle until the buoy off the N side of the shoal is sighted, or until her position is accurately determined. Course should then be steered for Isefjord Lighted Whistle Buoy, then S to the entrance of the main channel. If the lighted whistle buoy is not on station, a vessel should steer for Spodsbjerg Light on a bearing of more than 150° until on the prolongation of the channel axis, when she should steer for the entrance buoys.

A vessel approaching the main channel from E, whether passing outside or inside of Torup Flak, need not approach Isefjord Lighted Whistle Buoy, but may approach closer to Spodsbjerg, care being taken to avoid the 5m patch lying about 2 miles NE of Spodsbjerg.

After entering the dredged channel, the vessel should be guided by the channel buoys.

7.19 Yderbredning (55°52'N., 11°50'E.), the large basin of Isefjord is about 8 miles long from N to S and the same distance across. This outer part of Isefjord provides good anchorage anywhere in the basin. The bottom is sand and weed, with patches of mud. The E coast of the basin, formed by the peninsula of Horns Herred varies in elevation and is partly wooded, especially at the N end.

Ostergrund (55°51'N., 11°52'E.), in the E part of Yderbredning, has a least depth of 2.5m. This small shoal, on which there are some rocky patches, is marked on its W and S sides by a buoy.

Lysegrund, a shoal with rocky patches, lies in the SW part of Yderbredning, off the entrance of Lammefjord. The shoal has a least depth of 3.1m near its S end, it is marked by a buoy SE. A spoil ground lies on the W side of Lysegrund.

Alholm (55°55'N., 11°54'E.), an islet surrounded by boulders, lies about 1 mile SSE of the NW extremity of Horns Herred.

Jaegerspris Castile, which has a spire, lies about 5 miles SSE of the N extremity of Horns Herred.

Kynbyvaerkets (55°49'N., 11°53'E.) at the SE end of Yderbredning is owned by the Isefjord Electric Co. and serves as a large power station. It is available only for vessels serving the power station. The use of a pilot, obtained from Hundested, is recommended.

Depths—Limitations.—Tankers up to 40,000 dwt, with part cargo, can use the harbor, but dimensions must not exceed 250m, in length, a beam of 40m, or a draft of 6.5m.

There are depths of 7.2m alongside the quay fronting the power station and adjacent coal storage areas. The tanker berth S of the power station has depths of 7.2m.

A floating oil boom is sometimes laid 80m S, and then 100m SW from the S end of the quay; its outer end is marked by a buoy.

West Side—Yderbredning.—Nykobing Bugt, with the small port of Nykobing in its NW corner, forms the NW part of Isefjord. From Nykobing, the coast on the W side of Yderbredning consists of steep bluffs alternating with low-lying stretches, and inland are rounded hills with heights up to 61m. Much of the land is wooded, the principal woods near the coast being Annebjerg Skov, on the W side of Nykobing Bugt; Ulkerop Skov, close S of Annebjerg Skov; Stokkebjerg Skov, about midway between Nykobing Bugt and Lammefjord; and Kongsore Skov, immediately N of the entrance to Lammefjord.

Aspect.—Conspicuous on this coast is the Nykobing State Hospital which stands close N of Annebjerg. Egebjerg Church, with Egebjerg Mill, about 0.5 mile N are both prominent on the high ground W of Stokkebjerg Skov. Kongsore Naebble is a low point with some houses on its extremity.

Svolsbjerg (55°48'N., 11°44'E.), rises steeply from the shore to a height of 19m.

7.20 Nykobing Bugt (55°53'N., 11°43'E.) has a low and sandy N shore except near Ringholm. There is a conspicuous farm at the head of the bay.

The port facilities of Nykobing are located on a projecting tongue of land, which extends nearly 0.25 mile SSE from the shore at the head of the bay. The bay is almost completely filled by a flat, over which the depths are less than 5m and the shore bank is covered with rocks.

Ronnen, a rocky spit with a depth of only 0.3m extends 0.2 mile from the N entrance point and is marked by a buoy which exhibits a light from April to November.

Anchorage.—Anchorage can be taken in depths of 5.5m, good holding ground, mud over clay.

The bay provides good anchorage, as only winds from SE and SSE raise any sea.

Caution.—There is a private firing range in Nykobing Bugt where this activity is held principally from 0900 to 1200 on Sundays. The danger area is 0.6 mile wide and extends 2 miles out into the bay. Firing ceases when a vessel is in the area. Firing is indicated by a red flag hoisted at a mast near Gronnehave.

Nykobing (55°55'N., 11°41'E.) (World Port Index No. 29450) is a port divided into the old and new harbors and surrounds a small peninsula. The old harbor is mainly used for yachts.

Depths in the new harbor range from 1m at its inner end to 3.3m in its outer part.

The depth in the approach channel is 3.3m. In the old harbor there are depths from 1.8m to 2.5m.

A large yacht harbor is situated W of the new harbor with three piers extending SSE from its N side. The entrance, marked by lights, faces ENE and there are depths of 3m in the outer part and 1.5m in the inner part.

Pilots are available at Hundested and is compulsory for vessels over 150 grt and for all tankers.

At Nykobing, the water level may raise up to 1.8m with NW storms, and lower up to 1.2m with SE storms.

Lammefjord (55°48'N., 11°43'E.) is entered between Kongsore Naebbe and Svolsbjerg, about 0.7 mile SE.

Sidinge Fjord, a branch of Lammefjord, extends WNW; the heads of both fjords are closed by dams.

Lammefjord and Sidinge Fjord are of little navigational importance, and local knowledge is necessary for navigating in these fjords.

Approaches to Inderbredning and Holbaek Fjord

The channel W of **Oro** (55°46'N., 11°49'E.) is known as Oro Vestre Zob.

The W coast of the channel rises to hills. Two of the more conspicuous elevations are Trehoje, 44m high, and Bogeberg, 40m high, which are located about 2 miles S and 2 miles SSW, respectively, of the S entrance point of Lammefjord.

Both sides of Oro Vestre Lob are bordered by coastal banks which extend considerable distances from the shores of the passage. These banks are strewn with rocks and dry in places.

The E side of the N entrance point of the channel is marked by a buoy moored about 0.5 mile NW of the NW point of Oro.

Skinkelmaeren, a portion of the coastal bank fringing the N part of the W side of Oro, extends nearly 0.5 mile from the shore and dries at its outer edge; its W side is steep-to, and marked by a buoy. Loserup Light is shown on the W side of the channel, about 1 mile SSE of the S entrance point of Lammefjord. Honsehalsen, a wooded peninsula, lies on the W side of the channel and about midway between Lammefjord and Holbaek Fjord. A steep-to sandspit, with a drying patch on its outer part, extends about 0.2 mile E from the peninsula;

Honsehalsen Light is shown from the outer end of the sandspit.

Eskilsholm, a small islet, about 0.7 mile SE of Honsehalsen Light, lies on a wide rocky flat off the W side of Oro. A buoy, moored about 0.3 mile NW of Eskilsholm, marks the W side of the flat. Oro Fishing Harbor lies about 0.5 mile NW of the S extremity of Oro. A buoy on the E side of Oro Vestre Lob, is moored about 1 mile W of the S extremity of Oro.

Submarine cables extend across the channel from Oro Fishing Harbor to the vicinity of the N and S entrance points of Holbaek Fjord; cable beacons mark the landing places.

Holbaek (55°43'N., 11°43'E.) (World Port Index No. 29400), is a small port which lies about midway along the S side of **Holbaek Fjord** (55°44'N., 11°47'E.) and can be reached through a dredged channel. The town itself extends along a considerable part of the S shore of the fjord.

Tides—Currents.—The mean tidal rise at Holbaek is about 0.6m. The water level may be raised as much as 1.4m by storms from W through N to NE, and it may be lowered as much as 1.2m by storms from E through S to SW.

The tidal currents in Holbaek Fjord are weak. They change direction regularly during settled weather, the ingoing current setting along the N shore and the outgoing current setting along the S shore.

Depths—Limitations.—A channel dredged to a depth of 6.6m, and can accommodate vessels up to 110m in length and 6.6m draft.

The approach channel at the entrance to the fjord is very narrow, but has depths of up to 13m; sandbanks, steep-to in places, extend from Bognaes and Kirsebaerholm to the channel. Ronnen, an islet surrounded by boulders, lies on a sand flat extending 0.5 mile from the shore opposite Holbaek.

Aspect.—Two lights in range 241.5° lead through the dredged channel to a position about 0.2 mile N of the E end of Trafikhavn. Two lights, near the W end of Trafikhavn and in range 224°, lead through the inner reach of the dredged channel and into Trafikhavn.

Two beacons, in range 061.5°, on the S end of Oro, lead through the outer reach of the dredged channel.

Pilotage.—Pilots can be obtained from Hundested. A good mark is Holbaek Church, close S of the port. The Horby Ferry Slip is located on the shore N of Holbaek, and Horby Church can be seen about 1 mile WNW of the ferry slip. The Horby yacht harbor is situated on the N shore.

Caution.—Firing practice takes place frequently from a position on the N side of Holbaek Fjord, NE of Holbaek; the firing is in the direction of Kirsebaerholm.

Inderbredning (55°43'N., 11°49'E.)

7.21 The N part of Inderbredning is encumbered by the coastal bank which extends about 1 mile from the S end of Oro; the greater part of this bank consists of a sand flat with depths of less than 2m. Several small islands, the largest of which is Lindholm, lie on the sand flat. Lindholm Havn, at the NW end of Lindholm, consists of a quay 50m long with a depth alongside of about 5.2m.

A narrow spit with depths of less than 3m projects SE from the S end of the flat, and terminates in a 0.6m rocky patch, about 1 mile SSE of the S extremity of Lindholm; the extremity of the spit is marked by a buoy. Oro SW Pulle, a rocky patch with a least depth of 1.7m, lies about 0.7 mile SW of the S extremity of Lindholm, and is marked W by a buoy. A shoal patch with depths of 5.3m lies close SSW of Oro SW Pulle.

Dragerup Skov, a wooded area on the W side of Inderbredning, extends about 1 mile S from a position about 0.5 mile SE of Kirsebaerholm. A restricted area, of a naval mine station, extends about 0.5 mile offshore from the S half of Dragerup Skov.

Anchorage.—Inderbredning provides good anchorage in convenient depths nearly everywhere. The bottom is mud, with weed in many places. The coastal bank within the 5m curve on the E side of Inderbredning is mostly narrow and steep-to.

Roskilde Fjord with its entrance in 55°56'N, 11°54'E, leads off from Isefjord through Kulhus Rende. The entrance channel has a width of less than 183m in places. Eastward of the entrance the fjord widens out and then extends S for about 20 miles. The N side of the entrance consists of high sandhills attaining at Klintebakke, about 1 mile E of Lynaes, an altitude of 33m. Eastward of the dunes the land becomes lower, and Gronnesse Skov, a woods, lies close to the coast.

There are few conspicuous features as far as Frederiksvaerk, which lies in the NE corner of the fjord, and is surrounded by woods and elevated hills.

Tides—Currents.—The mean range of tide in Roskilde Fjord between the entrance and **Eskilso** (55°45'N., 12°05'E.) is 0.3 to 0.4m. Southward of Eskilso the tidal rise is imperceptible.

Winds between W and N may raise the water level up to 1.8m; winds between E and S may lower it 1m between the entrance and Eskilso, and somewhat less in the S part of the fjord.

The tidal currents follow the directions of the channels. They are of little importance in the S part of the fjord, but in the N part, especially in Kulhus Rende, they may have considerable strength.

Aspect.—Conspicuous landmarks on the N side of the fjord are: **Torup Church** (55°59'N., 11°56'E.) and Melby Church and Mill, about 1 mile NE; the chimneys of the steelworks, and Frederiksvaerk Church, about 0.2 mile SE, and 0.5 mile NE, respectively of Frederiksvaerk Havn; and **Maglehoj** (55°58'N., 12°02'E.), a conspicuous hill, 70m high, located less than 1 mile E of the steelworks.

Kulhuse Havn, a small harbor, lies on the N extremity of Horns Herred. The S side of the entrance is mostly low.

Prominent landmarks in this area are Kregme Church, about 1 mile SSE of Maglehoj; Kronprins Frederiks Bridge, which

crosses the fjord close NW of Frederikssund, and the church in the E part of Frederikssund.

Local knowledge necessary for navigating the channel S of Frederikssund.

Kulhus Rende to Dyrrnaes.—The shorebank on each side of Kulhus Rende is strewn with boulders and falls steeply from depths of 0.6 to 1m to depths of 8 to 16m in the channel.

A buoy is moored about 0.2 mile S of Klintebakke, near the edge of the shorebank on the N side of the channel. Buoys mark the S edge of the channel, inside the entrance to Roskilde Fjord.

Jydegrund and Kirkegrund, with least depths of 2m, lying on the N side of the deep channel, are each marked SE by a buoy. Espensgrund, with a least depth of 1.2m, lies close S of Kirkegrund, and is marked NW by a buoy.

Store Torvegrund, an extensive shoal with least depths of about 2m, lies close E of Kirkegrund, and is marked NW, N, and NE by buoys. The beacons at Hanehoved, in range 009.5°, lead in depths of not less than 6.5m between Kirkegrund and Store Torvegrund.

Teglgaards Hage, a spit with a depth of 2.2m near its outer end, extends about 2 miles SW from the shore W of Frederiksværk. The spit is marked by buoys near its SE side, and is separated from Store Torvegrund by a narrow channel.

7.22 Frederiksværk Staalvalseværks (55°59'N., 12°02'E.) (World Port Index No. 29415) is approached through a buoyed channel, dredged to a depth of 6m as far as the harbor entrance, with a width of 20m.

Depths—Limitations.—The harbor is accessible to vessels up to 90m in length; 13m beam; and a maximum draft of 6m. Winds from the N and NW can raise water levels by 1m, while S and E winds can lower the water level up to 1 m.

The speed limit in the harbor is 3 knots. Inbound vessels have priority over outbound vessels.

Frederiksværk Havn (55°58'N., 12°01'E.), the old harbor located about 0.3 mile N of Frederiksværk Staalvalseværks, is closed to navigation and is no longer maintained.

Lille Torvegrund, with depths of less than 4m, lies close E of Store Torvegrund, and extends S from the shorebank; its SW extremity is marked by a buoy.

Olsted Grund, a 2.8m patch, about midway between Lille Torvegrund and Dyrrnaes, lies at the E end of an extensive shoal; a buoy marks the E side of the patch.

The passage between Olsted Grund and Lille Torvegrund is marked by two beacons, in range 140°, located about 1 mile E of Dyrrnaes.

From Kulhus Rende, another channel, narrow, tortuous and marked by several buoys, leads S of Store Torvegrund to the fairway W of Lille Torvegrund.

A submarine cable crosses Roskilde Fjord from close S of Frederiksværk, across Store Torvegrund to Horns Herred.

Dyrrnaes to Frederikssund.—Off Dyrrnaes, where the deep channel narrows to a width of barely 183m, a pier close S of Dyrrnaes extends to the W side of the channel with a depth of 1.5m at its head. The steep-to shorebanks on either side are marked by a buoy.

Oksneholm and Ammesholm are two islets lying on the bank which extends from the W shore of the fjord; the edge of the bank is marked by a buoy.

Jorden (55°52'N., 12°02'E.), a shoal with a least depth of 2.8m, lies on the E side of the fairway, and about 1 mile E of Oksneholm; its SW extremity is marked by a buoy.

A buoyed channel, dredged to a depth of 5.8m, is entered close S of the SW extremity of Jorden. Lights in range 160°, and located in the NW part of Frederikssund, lead through the dredged channel.

Klinten and Kignaes are the E and W points of the narrows NW of Frederikssund. Kronprins Frederiks Bridge crosses the narrows, close NW of Frederikssund. A light near the middle of the bridge, in range about 174° with a light about 0.7 mile S, aids in the passage of the buoyed channel, dredged to a depth of 5.2m, and leading to the bridge approach.

Frederikssund (55°50'N., 12°03'E.) (World Port Index No. 29410) can accommodate vessels up to 4,000 dwt, with a draft of 5.3m. The port has an E quay with two berths with a total length of 140m and a depth of 3.8m to 5.2m. The S quay has a length of 140m long and a depth of 5.2m.

In addition to handling cargo, the port serves the stoneworks S of the town, and includes a small shipyard where wooden craft are constructed.

Aspect.—The S side of the harbor consists of a large mole extending W. There are depths of 5.2m in the entrance channel and alongside the N side of the mole.

The water level may be raised up to 1m by winds between W and N, and lowered up to 0.6m by the effect of S winds.

Pilotage.—Pilotage is not compulsory, however pilots are available from Hundestad.

7.23 Kronprins Frederiks Bridge (55°51'N., 12°02'E.) carries both road and rail traffic across the fjord about 1 mile below Frederikssund. This fixed bridge, supported by 3 piers, has a movable double bascule span between the two E piers. Horizontal passage clearance is 30m, and the vertical clearance is 3.3m above mean water level. The bridge opening is marked by a fixed green light on both sides of the W pier, and by a fixed red light on both sides of the E pier.

Vessels may request free passage through the bridge at any time from 0500 (between 1 October and April 1, from 0.5 hour before sunrise) until 0.5 hour after sunset.

Between the 15th of April and the 15th of September, the bridge will be opened once every hour during the following periods: Monday to Thursday 1600-1800; Friday 1600-2000; Saturday 0900-1800; Sunday 1000-2100. The bridge may be opened at other times only when arrangements have been made with the bridge guard during normal service hours.

Vessels able to pass under the bridge by lowering their masts must not request that the bridge be opened.

Signals.—All other vessels wishing to pass through must indicate their intentions at least 0.5 mile from the bridge by making the following signals:

By day—International Code Flag "N" (or, if not available, the national ensign) displayed at halfmast on the foremast, and sounding one long blast followed by one short blast on the whistle or fog horn.

By night—A white light at the bow and a sound signal similar to that made by day.

These signals will be answered by one of the following signals, day and night, from a signal mast on the bridge:

1. A fixed red light, indicating that passage is prohibited.
2. Two flashing red lights, indicating that southbound vessels can pass through the bridge. Passage cannot be made until the signal 3 is made.
3. Two fixed red lights, indicating that southbound vessels can pass through the bridge.
4. Three flashing red lights, indicating that northbound vessels can pass through the bridge.

A steady sound signal, given by day or night, will indicate that the bridge cannot be opened despite the passage signal made. The signal to pass will be extinguished, insofar as conditions permit.

Vessels will remain at least 101m from the bridge until the signal permitting passage is shown.

Only one vessel at a time shall pass through the bridge opening. All vessels passing through the bridge must have their anchors ready to let go.

Vessels will proceed at the lowest speed consistent with maneuverability within a distance of 201m on either side of the bridge.

Mooring to the bridge is prohibited.

Anchoring within 201m of the bridge is prohibited except in cases of urgent necessity, such as to avoid striking the bridge.

Vessels must comply with the orders given by the bridge guards when within 201m of the bridge.

Submarine cables cross the fjord N and S of the bridge.

Two large circular dolphins for breaking ice have been established close N of the bridge and a row of posts is connected to the W dolphin.

In the fjord S of Frederikssund, there are several overhead high tension lines and submarine cables that cross the channels. These overhead lines have a clearance of 27m over the channels at MLW. The submarine cables are marked.

Roskilde (55°39'N., 12°05'E.) (World Port Index No. 29430) will accommodate small vessels up to a length of 40m, a beam of 8m, and a draft of 2.8m.

Pilotage.—Pilots for Roskilde Fjord are obtained from Hundested. Pilotage is recommended for vessels of over 500 dwt and bound for Frederikssund.

Anchorage.—Anchorage can be taken anywhere in Roskilde Fjord where the depth and the width of the fairway permit.

Regulations.—Regulations for the navigation of Danish waters apply to the harbors and entrances of Frederiksværk, Frederiksværk Staalvalseværk Havn, Frederikssund, and Roskilde, except that an outbound vessel must wait and allow inbound vessels to pass.